ACKNOWLEDGMENT OF COMPLETION REPORT

FOR

MAGNABLEND SODIUM CHLORITE
100 WEST STERRETT ROAD
WAXAHACHIE, ELLIS COUNTY, TEXAS

Prepared for

U.S. Environmental Protection Agency
Will LaBombard, Project Officer
1445 Ross Avenue
Dallas, Texas 75202

Contract No. EP-W-06-042
Technical Direction Document No. 1/WESTON-042-15-006
TDD No. TO-0001-42-15-06
WESTON W.O. No. 20406.012.001.0929.01
NRC No. 1106638
FPN ID: N/A
CERCLIS ID: N/A
EPA OSC: John Martin
START-3 PTL: Sean Gavlas

Submitted by

Weston Solutions, Inc.
Cecilia H. Shappee, P.E., Program Manager
5599 San Felipe, Suite 700
Houston, Texas 77056
(713) 985-6600

12 March 2015

500007075

ACKNOWLEDGMENT OF COMPLETION REPORT

1. INTRODUCTION

On 26 January 2015 at approximately 1400 hours, a gaseous release was observed from a 330-gallon poly tote, containing approximately 150 gallons of 31% sodium chlorite solution at the Magnablend Texas Liquid Blending Facility, located at 100 West Sterrett Road in Waxahachie, Ellis County, Texas. The release occurred approximately 30 feet west of the main structure of the facility, 0.1 mile east of Texas Interstate (I)-35E, and 250 feet west of the nearest residence. A release of chlorine gas (Cl_2) or chlorine dioxide (ClO_2) from a poly tote, containing sodium chlorite posed a threat to facility employees and nearby residents directly east of the facility. Since ClO_2 is a common product formed from the reaction of sodium chlorite with oxidizing agents and acids, air monitoring was conducted using calibrated VRAE and AreaRAE units equipped with Cl_2 sensors that are cross-sensitive to ClO_2.

At approximately 1500 hours, the U.S. Environmental Protection Agency (EPA) Region 6 Prevention and Response Branch (PRB) Phone Duty Officer became aware of a chemical release at a chemical facility via a local television news report. At approximately 1530 hours, after contacting the Texas Commission on Environmental Quality (TCEQ) to verify the release and response activities, EPA On-Scene Coordinator (OSC) John Martin was notified of the incident and activated Weston Solutions, Inc. (WESTON®), the EPA Region 6 Superfund Technical Assessment and Response Team (START-3) contractor, to assist TCEQ by conducting a Tier 2 incident response. As directed by OSC Martin and as outlined in Technical Direction Document (TDD) No. 1/WESTON-042-15-006 (Attachment I), START-3 was tasked to document response activities and to provide technical support to EPA.

The Magnablend Texas Liquid Blending Facility, the location of the release, is located at 100 West Sterrett Road, Waxahachie, Ellis County, Texas. The geographic coordinates of the release site are Latitude 32.475007° North and Longitude 96.833628° West and were determined using a handheld Global Positioning System (GPS) based on the World Geodetic System – 1984 (WGS-84) with accuracy estimated at less than 50-feet circular probable error. A Site Location Map and Site Area Map are included as Attachments A and B, respectively.

2. BACKGROUND

On 26 January 2015 at approximately 1400 hours, a gaseous release was observed from a 330-gallon poly tote, containing approximately 150 gallons of 31% sodium chlorite solution at the Magnablend Texas Liquid Blending Facility (Facility), owned by Univar, Inc., the potentially responsible party (PRP). The Facility blends and manufactures chemicals for several industries including oil field, agriculture, pet food and feed supplements, water treatment, and construction and industrial cleaning. The release occurred approximately 30 feet west of the main structure of the facility, 0.1 mile east of I-35E, and 250 feet west of the nearest residence. A release of chlorine gas or chlorine dioxide from a tote, containing sodium chlorite, posed a threat to facility employees and nearby residents directly east of the facility. A map of the release location is included in the Site Sketch Map presented in Attachment C.

3. SUMMARY OF ACTIONS

On 26 January 2015 at approximately 1400 hours, a Univar employee at the Facility observed vapors emitting from a 330-gallon tote, containing sodium chlorite. Emergency procedures were initiated that included activation of the facility alarm system to notify employees to evacuate. The Facility alarm system automatically activated an emergency water deluge system intended for use during an inadvertent release of sodium hydroxide from an adjacent tank. As the nearby area and tote were flushed by the deluge water, the contents of the tote continued to react until it finally ruptured. The deluge water flushed the diluted sodium chlorite solution into the on-site drainage system, and the diluted solution flowed downgradient and ponded approximately 100 feet northeast of the structure. Shortly after the initial response measures, the Waxahachie Fire Department Battalion Chief implemented a voluntary evacuation of residents and employees within a 0.5 mile radius of the release, including the closure of the access road east of I-35E and streets adjacent to the Facility. Door-to-door notification was conducted by local law enforcement and on-site fire personnel.

Following the initial emergency response, Univar hired a local environmental contractor, TAS Environmental, to assess the chemical release. After conducting two entries while wearing Level B personal protective equipment (PPE), the contractor reported the situation had been stabilized by the deluge water and only a small amount of crystalized sodium chlorite was observed on the tote

and in the drainage pathway. Facility maintenance crews then returned to the release site to flush the remaining diluted sodium chlorite solution into the Facility drainage system.

At approximately 1530 hours, EPA OSC John Martin was deployed to the incident and EPA START-3 was activated to support the emergency response, to conduct an assessment of the incident and to monitor the PRP cleanup activities at the site.

TCEQ arrived on-site at approximately 1610 hours and was the lead environmental agency for the response. At 1740 hours, the EPA Team arrived on-site to provide support by conducting roving air monitoring operations near the Facility and the adjacent residential neighborhood directly east of the Facility. Air monitoring was conducted using calibrated VRae and AreaRae units equipped with Cl_2 sensors that are also cross-sensitive to ClO_2.

Air monitoring results of 0.0 to 0.2 parts per million (ppm) of Cl_2 were observed near the diluted sodium chlorite solution ponded directly northeast of the Facility. Readings of 0.0 ppm Cl_2 were observed at the nearest residence directly east of the facility and in the surrounding neighborhood to the east. The EPA Team referenced the Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) of 0.5 ppm time-weighted average (TWA) for Cl_2 and 0.1 ppm TWA for ClO_2 to determine an action level.

At approximately 1830 hours, the EPA Team notified the Waxahachie Fire Department Battalion Chief that the air monitoring results were below the established action level and the evacuation request was lifted. At 1900 hours, the EPA Team demobilized from site. TCEQ oversaw the final cleanup and disposal of the diluted sodium chlorite solution ponded at the facility.

This final report was prepared as part of the requirements of TDD No. 1/WESTON-042-15-006 and serves as documentation of work completed to date.

4. LIST OF ATTACHMENTS

A. Site Location Map

B. Site Area Map

C. Site Sketch Map

D. Site Logbook

E. Pollution Report

F. NRC Report No. 1106638

G. Digital Photographs

H. OSHA Permissible Exposure Limits

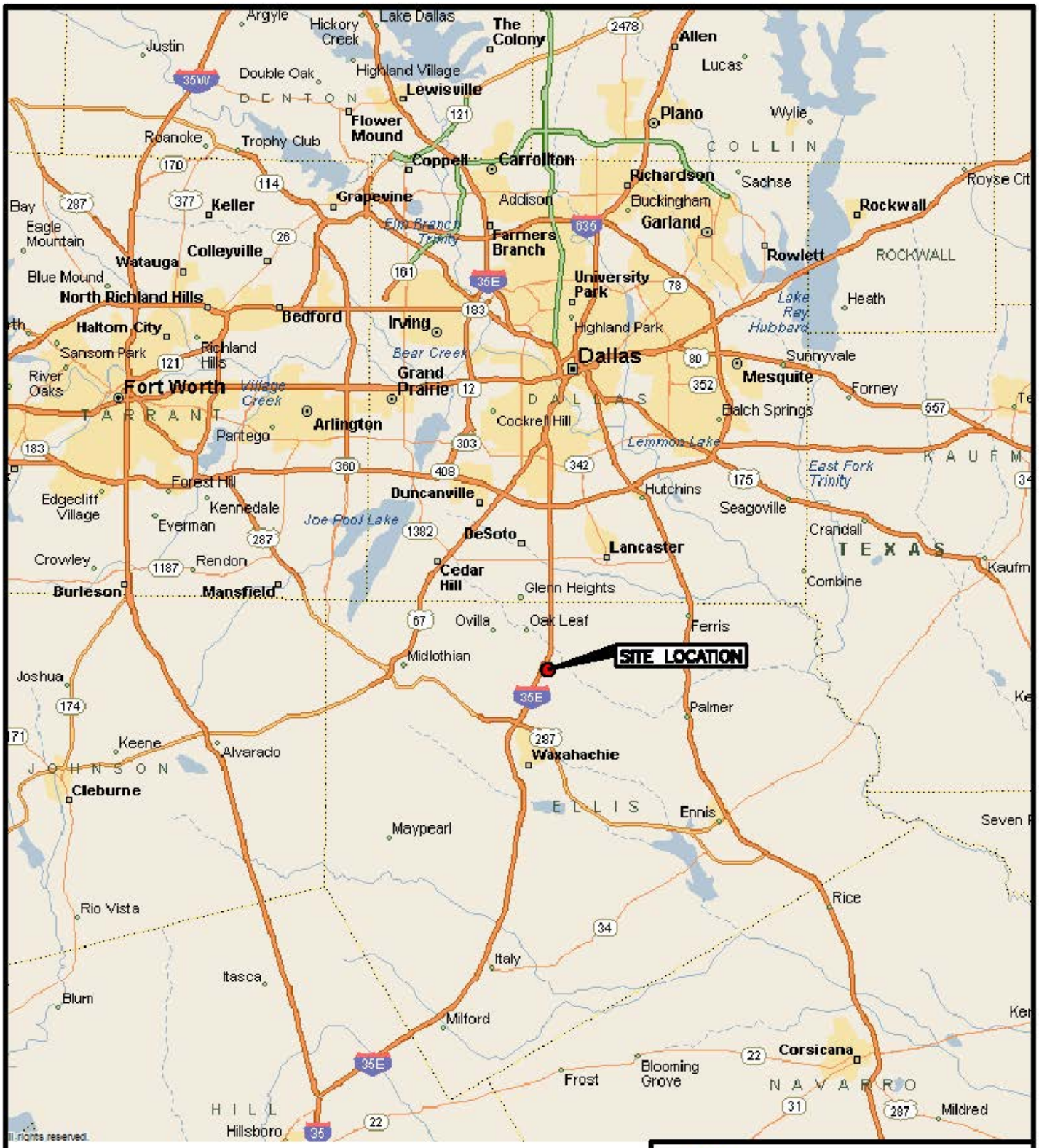
I. TDD No. 1/WESTON-042-15-006

☐ The EPA Task Monitor did not provide final approval of this report prior to the completion date of the work assignment. Therefore, Weston Solutions, Inc. has submitted this report absent the Task Monitor's approval.

☒ The EPA Task Monitor has provided final approval of this report. Therefore, Weston Solutions, Inc. has submitted this report with the Task Monitor's approval.

Attachment A

Site Location Map



US EPA REGION 6

ATTACHMENT A
SITE LOCATION MAP

MAGNABLEND SODIUM CHLORITE
100 WEST STERRETT ROAD
WAXAHACHIE, ELLIS COUNTY, TEXAS

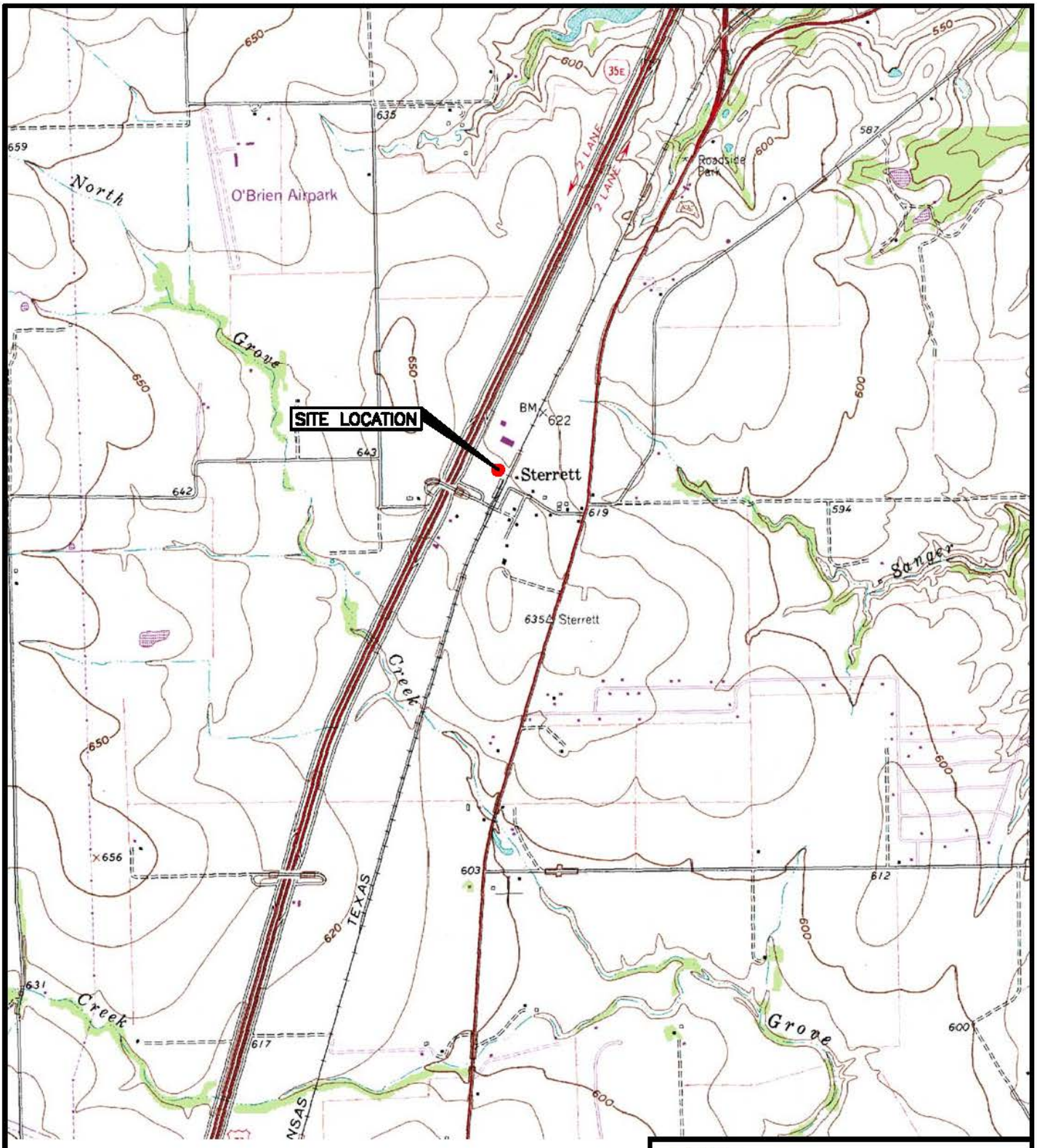
DATE:	W.O. #	SCALE:
FEB 2015	20408.012.001.0929.01	NOT TO SCALE

SOURCE: MICROSOFT STREETS 2009.
NRC No.: 1108638
TDD No.: 1/WESTON-042-15-006

H:\START III EPA\0929_Magnablend Sodium Chlorite\0225151102.dwg Mar 12, 2015 - 12:56pm

Attachment B

Site Area Map



0 1000 2000

SCALE IN FEET

N

SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHIC, WAXAHACHIE, TEXAS (1978).
NRC No.: 1106638
TDD No.: 1/WESTON-042-15-006

US EPA REGION 6

ATTACHMENT B

SITE AREA MAP

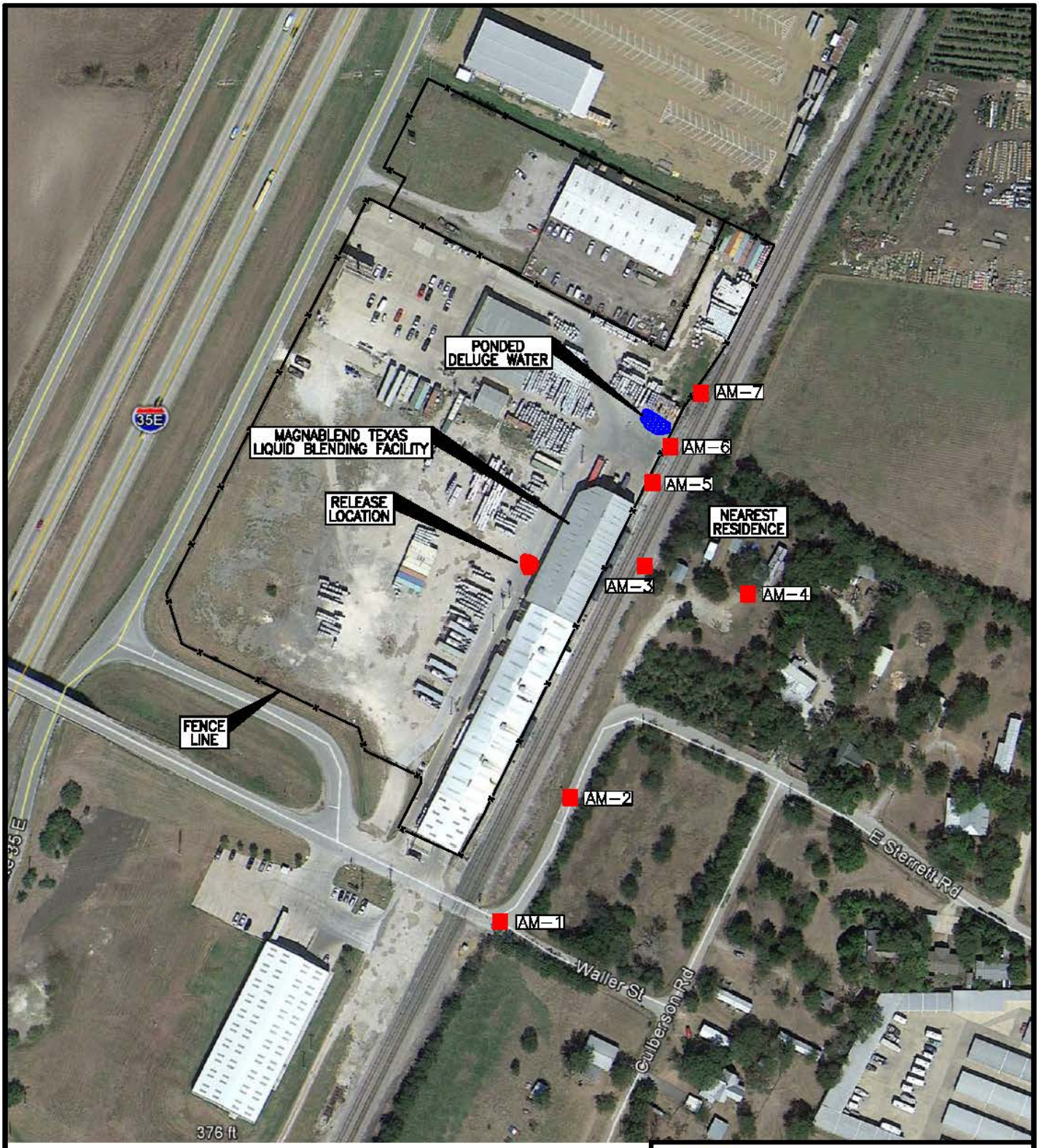
MAGNABLEND SODIUM CHLORITE
100 WEST STERRETT ROAD
WAXAHACHIE, ELLIS COUNTY, TEXAS

DATE:	W.O. #	SCALE:
FEB 2015	20406.012.001.0929.01	AS SHOWN

H:\START III EPA\0929_Magnablend Sodium Chlorite\0225151009.dwg Mar 12, 2015 - 12:58pm

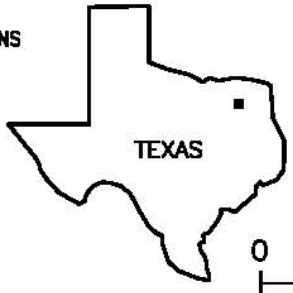
Attachment C

Site Sketch Map



LEGEND:

AIR MONITORING LOCATIONS



N

0 100 200

SCALE IN FEET

SOURCE: GOOGLE EARTH PRO AERIAL 2014.
NRC No.: 1108638
TDD No.: 1/WESTON-042-15-006

US EPA REGION 6

ATTACHMENT C

SITE SKETCH MAP

MAGNABLEND SODIUM CHLORITE
100 WEST STERRETT ROAD
WAXAHACHIE, ELLIS COUNTY, TEXAS

DATE:	W.O. #	SCALE:
FEB 2015	20406.012.001.0929.01	AS SHOWN

H:\START III EPA\0929_Magnablend Sodium Chlorite\0225151203.dwg Mar 12, 2015 - 1:46pm

Attachment D

Site Logbook

Outdoor writing products
for Outdoor writing people

RECYCLABLE

All components of this product are recyclable

Rite in the Rain

A patented, environmentally responsible, all-weather writing paper that sheds water and enables you to write anywhere, in any weather.

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Tacoma, WA 98424-1017 USA
www.RiteintheRain.com

Item No. 391
ISBN: 978-1-932149-22-7

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20406.012.001.0929.01
1/WESTON-042-15-006
~~20406.012.001.0932.01~~

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JOURNAL
№ 391

Magnablend
~~Gordon Aviation~~

1 of 1

Rite in the Rain®
ALL-WEATHER WRITING PAPER

Name Sean Gavlas

Address 3900 Dallas Parkway, Suite 175
Plano, TX 75093

Phone 609-433-8434

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CONTENTS

PAGE	REFERENCE	DATE
	Sean Gavlas - PTL 609-433-8434	
	José Ojeda - FSO 619-417-3298	

4/26/2013

1/WESTON-042-15-006
20406.012.001.0929.01

1/26/2015 Sean Gowles

1532 - START Gowles received notification from OSC Martin of a Cl_2 release from the Magnablend Facility.

1741 - START on-site. START Ojeda and START Gowles met with OSC John Martin and TCEQ rep.

1800 - START completed AreaRae, VRAE, and Multi-Rae Check and began roving monitoring along Tenaha directly east of the Facility at the request of TCEQ's Terrell Cooper, the Texas State lead on-site. When the Facility responders activated the Facility alarm system after an employee witnessed the gas releasing from the tote, a deluge system deployed that washed the Sodium chlorite from the tote that had ruptured, down gradient. The dilute Sodium chlorite solution has ponded just northeast of the main Facility structure. Adjacent to the ponded water readings were observed using the VRae and AreaRae of 0.0 to 0.2 Readings observed at the nearest residence and adjacent neighborhood were 0.0 ppm.

1/WESTON-042-15-006
20406.012.001.0929.01

1/26/2015 Sean Gowles

1830 hrs - Air monitoring completed. OSC Martin notified the Waxahachie Emergency Manager of the air monitoring readings and the evacuation order was lifted.

Note: Weather on-site was approximately 64°F, clear skies, 41% humidity, and winds out of the SSW @ 0-5 mph according to Weather Underground.

The Terrell Cooper was the TCEQ Emergency Response Coordinator on-site. Phone #: Cell: 817-692-7957

Jamal Haider - Univar (Magnablend) EHS Coordinator. Phone # Cell: 214-883-7504

1830 hrs. - START off-site.

1/26/2015

End of Logbook

Attachment E

Pollution Report

U.S. ENVIRONMENTAL PROTECTION AGENCY
POLLUTION/SITUATION REPORT
Magnablend - Removal Polrep
Initial Removal Polrep

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region VI

Subject: **POLREP #1**
INITIAL and FINAL
Magnablend

Waxahachie, TX

To:
From: John Martin, OSC
Date: 1/26/2015
Reporting Period:

1. Introduction

1.1 Background

Site Number:		**Contract Number:**	
D.O. Number:		**Action Memo Date:**	
Response Authority:	CERCLA	**Response Type:**	Emergency
Response Lead:	EPA	**Incident Category:**	Removal Assessment
NPL Status:	Non NPL	**Operable Unit:**	
Mobilization Date:	1/26/2015	**Start Date:**	1/26/2015
Demob Date:	1/26/2015	**Completion Date:**	
CERCLIS ID:		**RCRIS ID:**	
ERNS No.:	NRC# 1106638	**State Notification:**	TCEQ
FPN#:		**Reimbursable Account #:**	

Incident Category: Active Production Facility

Location: 100 West Sterrett Road, Waxahachie, Ellis County, Texas. The geographic coordinate of the release was Latitude: 32.475007 degrees North, Longitude: 96.833628 degrees West.

Description of Threat: Univar, which owns and operates the Magnablend Texas Liquid facility, reported to the National Response Center (NRC# 1106638) a release of chlorine gas from a tote at 1515 hr on 26 January 2015 and that a 0.5 mile radius to the incident had been evacuated, including private citizens and employees.

On 26 January 2015 at approxiamtely 1400 hr local incident time, a gaseous release was observed from a 330 gallon poly tote containing approximately 150 gallons of 31% sodium chlorite solution at the Magnablend Texas Liquid Facility. The release occurred approximately 30 ft. west of the main structure of the Magnablend Texas Liquid Facility, 0.1 miles east of I-35E, and 250 ft. west of the nearest residence. A release of chlorine gas from a tote containing sodium chlorite posed a threat to facility employees and

nearby residents directly east of the facility.

2. Current Activities

2.1 Operations Section

Response Actions to Date: At approximately 1400 hr on 26 January 2015, a Univar employee observed vapors emitting from a 330 gallon tote containing sodium chlorite at the Magnablend Texas Liquid Facility. Emergency procedures were initiated which included activation of the facility alarm system to notify employees to evacuate. Once the alarm was sounded, a water deluge system was activated which flushed a sodium hydroxide tank and the nearby area surrounding the tote. As the contents of the tote continued to react, it eventually ruptured. The diluted sodium chlorite solution was flushed by the deluge water into the onsite drainage and ponded approximately 100 ft. northeast of the structure. Shortly after the initial facility response measures, the Waxahachie Fire Department and the Waxahachie Emergency Manager arrived on-scene. Waxahachie Fire Department Batallion Chief Randy Muirhead implemented a voluntary evacuation of residents and employees within a 0.5 mile radius of the release which included the closure of the east side access road of I-35E and streets adjacent to the facility. Door to door notification of the evacuation was conducted by local law enforcement and on-scene fire personnel.

Univar hired a local environmental contractor, TAS Environmental, to assess the spilled material utilizing Level B PPE. After two entries, they reported that the situation had been stabilzed by the deluge water and that only a small amount of sodium chlorite had crystalized. Facility maintenance crews then returned to wash the remaining materials into the facility's drainage system.

At approximately 1520 hr., the U.S. Environmental Protection Agency (EPA) was notified of the incident by the National Response Center (NRC) and initiated a response. EPA On-Scene Coordinator (EPA OSC) John Martin was deployed to the incident and EPA START 3 was activated to support the emergency response, conduct an assessment of the incident, and to monitor the PRP cleanup activities at the site. TCEQ responders arrived on-scene at approximately 1610 hr.

At 1740 hr., START arrived on-scene and began air monitoring operations near the facility and the adjacent residential neighborhood directly east of the facility. Roving air monitoring was conducted using calibrated VRAE and AreaRae units equipped with Cl2 sensors along the fence line downwind and directly east of the facility fence line. Air monitoring results of 0.0 to 0.2 ppm for Cl2 gas were observed near the dilute sodium chlorite solution ponded directly northeast of the facility. Readings of 0.0 were observed at the nearest residence directly east of the facility and in the surrounding neighborhood to the east. START was using a conservative action level of 1 ppm.

At approximately 1830 hr., OSC Martin notified the Fire Chief of the air monitoring results and the evacuation request was lifted and the access road re-opened. The EPA Team demobilized from Site at approximately 1900 hr.

2.2 Planning Section

TCEQ will continue to monitor the final cleanup measures and ensure the appropriate disposal of the ponded diluted sodium chlorite solution.

Although local media interest was high, there were no issues with the immediate response. Activating the deluge system averted a more hazardous situation.

2.3 Logistics Section

n/a

2.4 Finance Section

n/a

2.5 Other Command Staff

The Incident Commander was Waxahachie Fire Department Battalion Chief Randy Muirhead.

3. Participating Entities

Waxahachie Fire Department / Police Department / Emergency Management
Univar / Magnablend / TAS Environmental
TCEQ
EPA

4. Personnel On Site

n/a

5. Definition of Terms

n/a

6. Additional sources of information

n/a

7. Situational Reference Materials

No information available at this time.

Attachment F

NRC Report No. 1106638

Submit Action Report | Spill Summary Report

NATIONAL RESPONSE CENTER 1-800-424-8802
*****GOVERNMENT USE ONLY***GOVERNMENT USE ONLY*****
Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 1106638

INCIDENT DESCRIPTION

***Report taken by: MST2 JOSHUA DIAZ at 16:15 on 26-JAN-15**
Incident Type: STORAGE TANK
Incident Cause: UNKNOWN
Affected Area:
Incident was discovered on 26-JAN-15 at 14:00 local incident time.
Affected Medium: AIR / ATMOSPHERE

REPORTING PARTY

Name: JAMAL HAIEER
Organization: UNIVAR INC
Address: 100 WEST STERRETT RD
WAXAHACHIE, TX

PRIMARY Phone: (214)8837504 Phone: (817)9809476
Type of Organization: PRIVATE ENTERPRISE

SUSPECTED RESPONSIBLE PARTY

Name: JAMAL HAIEER
Organization: UNIVAR INC
Address: 100 WEST STERRETT RD
WAXAHACHIE, TX
PRIMARY Phone: (214)8837504
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

100 WEST STERRETT RD County: ELLIS

City: WAXAHACHIE State: TX

RELEASED MATERIAL(S)

CHRIS Code: CLX Official Material Name: CHLORINE
Also Known As:
Qty Released: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

CALLER IS REPORTING THE RELEASE OF CHLORINE GAS FROM A TOTE AND THERE WAS AN EVACUATION OF .5 MILES OF THE INCIDENT WHICH INCLUDES PRIVATE CITIZENS AND EMPLOYEES. THE FIRE DEPARTMENT IS ON SCENE CURRENTLY.

INCIDENT DETAILS

Description of Tank: PLASTIC TOTE
Tank Above/Below Ground: ABOVE
Transportable Container: UNKNOWN
Tank Regulated: UNKNOWN
Tank Regulated By:
Tank ID:
Capacity of Tank: 330 UNKNOWN AMOUNT
Actual Amount: 0 UNKNOWN AMOUNT

IMPACT

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES:	NO	Hospitalized:	Empl/Crew:	Passenger:	
FATALITIES:	NO	Empl/Crew:	Passenger:	Occupant:	
EVACUATIONS:	YES	Who Evacuated:	EVERYONE	Radius/Area:	.5 Mile(s)

Damages: NO

Closure Type		Description of Closure	Hours Closed	Direction of Closure	
Air:	N				
Road:	N			Major Artery:	N
Waterway:	N				
Track:	N				

Passengers Transferred: NO
Environmental Impact: UNKNOWN
Media Interest: UNKNOWN Community Impact due to Material:

REMEDIAL ACTIONS

NONE.
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

Weather: UNKNOWN, °F

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local: TCEQ, FD
State/Local On Scene: FD
State Agency Number:

NOTIFICATIONS BY NRC

CENTERS FOR DISEASE CONTROL (GRASP)
26-JAN-15 16:23 (770)4887100
DHS TEXAS FUSION CENTER (INTELLIGENCE OFFICERS)
26-JAN-15 16:23 (202)3068204
DOT CRISIS MANAGEMENT CENTER (MAIN OFFICE)
26-JAN-15 16:23 (202)3661863

U.S. EPA VI (MAIN OFFICE)
26-JAN-15 16:25 (866)3727745 ROTENBERRY
USCG NATIONAL COMMAND CENTER (MAIN OFFICE)
26-JAN-15 16:24 (202)3722100 DUTY OFFICER
JFO-LA (COMMAND CENTER)
26-JAN-15 16:23 (225)3366513
NATIONAL INFRASTRUCTURE COORD CTR (MAIN OFFICE)
26-JAN-15 16:23 (202)2829201
NOAA RPTS FOR TX (MAIN OFFICE)

26-JAN-15 16:23 (206)5264911
NATIONAL RESPONSE CENTER HQ (MAIN OFFICE)
26-JAN-15 16:24 (202)2671136 NRCDO
NATIONAL RESPONSE CENTER HQ (AUTOMATIC REPORTS)
26-JAN-15 16:23 (202)2671136
NTSB PIPELINE (MAIN OFFICE)
26-JAN-15 16:23 (202)3146293
TCEQ (MAIN OFFICE)
26-JAN-15 16:23 (512)2392507
TCEQ (REGION 4)
26-JAN-15 16:23 (512)2392507
DEPT OF ENERGY STPR (STRATEGIC PETROLEUM RESERVE-EMERGENCY MGMT)
26-JAN-15 16:23 (504)7344113
TX DEPT OF STATE HEALTH SERVICES (COMMAND CENTER)
26-JAN-15 16:23 (512)4587220
TEXAS STATE OPERATIONS CENTER (COMMAND CENTER)
26-JAN-15 16:23 (512)4242208
USCG DISTRICT 8 (MAIN OFFICE)
26-JAN-15 16:23 (504)5896225
USCG DISTRICT 8 (PLANNING)
26-JAN-15 16:23 (504)6712080

ADDITIONAL INFORMATION

***** END INCIDENT REPORT # 1106638 *****
Report any problems by calling 1-800-424-8802
PLEASE VISIT OUR WEB SITE AT http://www.nrc.uscg.mil

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MODE
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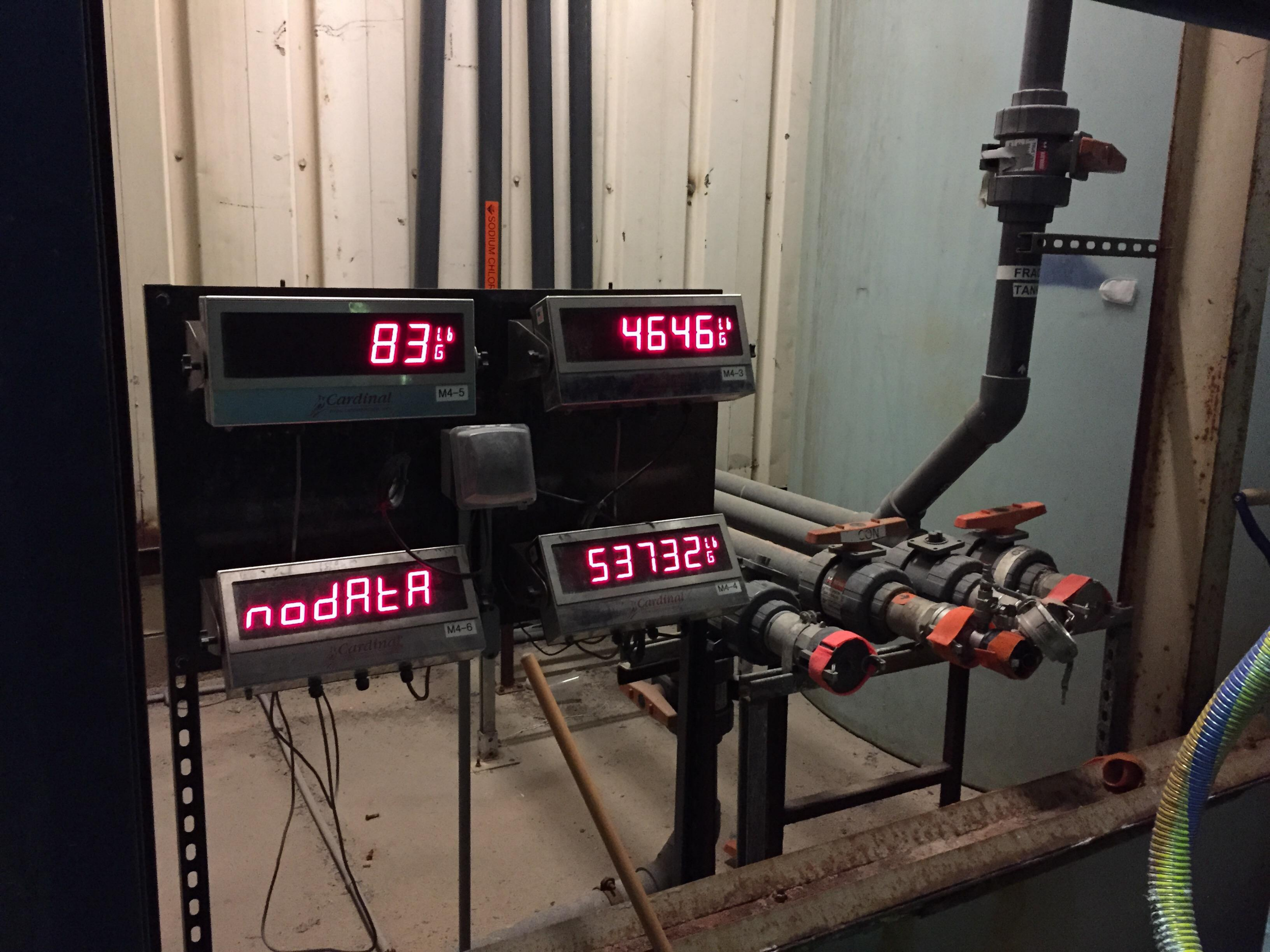
TCEQ
EMERGENCY
RESPONSE


83 LB G
M4-5
Cardinal
4646 LB G
M4-3
nodAtA
M4-6
Cardinal
53732 LB G
M4-4
Cardinal
SODIUM CHLOR
CON


KOMATSU
P0209


TILX 201836

SODIUM CHLORITE SOLUTION 31%

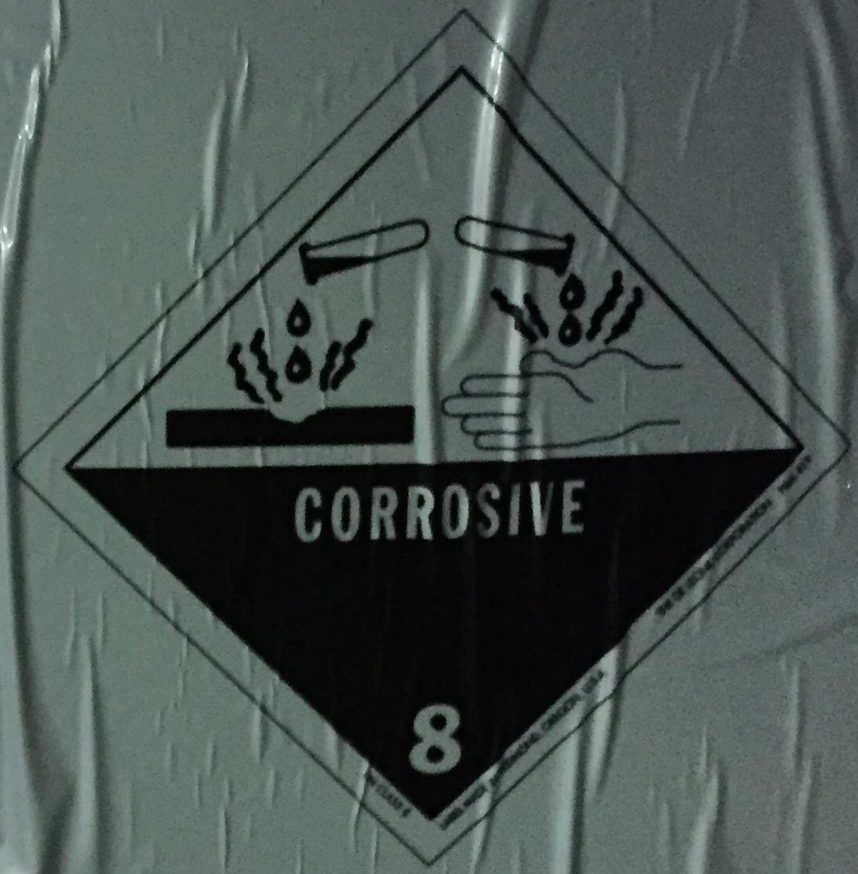
11-RS1650-COR

DANGER: CORROSIVE
WILL BURN SKIN & EYES.
KEEP OUT OF REACH OF CHILDREN
Do not take internally.
See MSDS for additional precautionary information.

		HAZARD INDEX
3	HEALTH	4 SEVERE HAZARD
0	FLAMMABILITY	3 SERIOUS HAZARD
1	REACTIVITY	2 MODERATE HAZARD
X	PERSONAL PROTECTION EQUIP	1 SLIGHT HAZARD
		0 MINIMAL HAZARD

PROTECTIVE EQUIP.

A		E		I			
B		F		J			
C		G		K			
D		H		X			



Chlorite solution, 8, UN1908, II

Lot # 386ELAZ203

Vendor: OXYCHEM


3-5


KOMATSU
30
WIL
P0209
HALLIBURTON

NON-HAZ

Product Code:

WASTE WATER

Lot N/A

Tank Capacity 5000

Gallons Per Inch _____

Attachment H

OSHA Permissible Exposure Limits

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

May 1994

Immediately Dangerous to Life or Health Concentrations (IDLH)

Chlorine dioxide

CAS number: 10049–04–4

NIOSH REL: 0.1 ppm (0.3 mg/m3) TWA, 0.3 ppm (0.9 mg/m3) STEL

Current OSHA PEL: 0.1 ppm (0.3 mg/m3) TWA

1989 OSHA PEL: 0.1 ppm (0.3 mg/m3) TWA, 0.3 ppm (0.9 mg/m3) STEL

1993-1994 ACGIH TLV: 0.1 ppm (0.28 mg/m3) TWA, 0.3 ppm (0.83 mg/m3) STEL

Description of Substance: Yellow to red gas or a red-brown liquid (below 52 F) with an unpleasant odor similar to chlorine and nitric acid.

LEL: . . Unknown

Original (SCP) IDLH: 10 ppm

Basis for original (SCP): IDLH AIHA [1958] reported that rats exposed repeatedly to about 10 ppm for 4 hours daily died, whereas those exposed to about 0.1 ppm, 5 hours daily for 10 weeks, showed no detectable effects [Dalhamn 1957]. AIHA [1958] also reported that animals survived 2-hour exposures to 20 ppm, though some species exhibited symptoms [Gloemme and Lundgren 1957]. Elkins [1950] stated that 5 ppm is definitely irritating and 2 cases of illness (1 fatal) resulted from exposure to less than 19 ppm. AIHA [1958] reported that delayed deaths occur in animals after single exposures to 150 to 200 ppm for less than 1 hour [Gloemme and Lundgren 1957]. Based on the data cited above, an IDLH of 10 ppm is chosen.

Short-term exposure guidelines None developed

ACUTE TOXICITY DATA

Lethal concentration data:

Species	Reference	LC_{50} (ppm)	LC_{Lo} (ppm)	Time	Adjusted 0.5-hr LC (CF)	Derived value
Rat	Dalhamn 1957	-----	260	2 hr	416 ppm (1.6)	42 ppm

Lethal dose data:

Species	Reference	Route	LD_{50} (mg/kg)	LD_{Lo} (mg/kg)	Adjusted LD	Derived value
Rat	Abdel-Rahman et al. 1982	oral	292	-----	729 ppm	73 ppm

Human data: It has been reported that 5 ppm is definitely irritating and that 19 ppm caused the death of one worker inside a tank (time of exposure was not specified) [Elkins 1950].

Revised IDLH: 5 ppm
Basis for revised IDLH: The revised IDLH is 5 ppm based on acute inhalation toxicity data in humans [Elkins 1950].

REFERENCES:

1. Abdel-Rahman MS, Gerges SE, Alliger H [1982]. Toxicity of alcide. J Appl Toxicol *2*(3):160-164.

2. AIHA [1958]. Chlorine dioxide. In: Hygienic guide series. Am Ind Hyg Assoc J *19*:261-262.

3. Dalhamn T [1957]. Chlorine dioxide: toxicity in animal experiments and industrial risks. AMA Arch Ind Health *15*(2):101-107.

4. Elkins HB [1950]. Chlorine dioxide, ClO_2. In: The chemistry of industrial toxicology. New York, NY: John Wiley & Sons, Inc., pp. 87-88.

5. Gloemme J, Lundgren KD [1957]. Health hazards from chlorine dioxide. AMA Arch Ind Health *16*:169-176.

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CHLORINE

- Index of Chemical Names (/niosh/pel88/npelname.html)
- Index of CAS Numbers (/niosh/pel88/npelcas.html)

OSHA comments from the January 19, 1989 Final Rule on Air Contaminants Project extracted from 54FR2332 et. seq. This rule was remanded by the U.S. Circuit Court of Appeals and the limits are not currently in force.

CAS: 7782-50-5; **Chemical Formula:** Cl_2

The previous OSHA limit for chlorine was 1 ppm as a ceiling limit. OSHA proposed to revise this limit to 0.5 ppm measured over 15 minutes, which was the limit recommended by NIOSH (1976b/Ex. 1-276) in its criteria document; NIOSH (Ex. 8-47, Table N1) concurred with the proposed limit. However, the final rule establishes a PEL of 0.5 ppm TWA with a 15-minute short-term exposure limit of 1 ppm for chlorine. Chlorine is a greenish-yellow, noncombustible gas at atmospheric pressure; it has a suffocating odor. At -35 C, it condenses to an amber liquid.

Exposure to chlorine at concentrations around 5 ppm has been associated with respiratory symptoms, erosion of the teeth, and inflammation of the mucous membranes (Flury and Zernik 1931c/Ex. 1-1199; Patty 1963c/Ex. 1-854). Ferris, Burgess, and Worcester (1967/Ex. 1-316) reported slight effects on the respiratory system in workers exposed to chlorine concentrations ranging from negligible to 7 ppm. Rupp and Henschler (1967/Ex. 1-1122) reported burning of the eyes among human subjects exposed to 0.5 ppm; an unspecified number of these subjects reported painful eyes after 15 minutes' exposure to this level. In a separate test, subjects reported respiratory irritation on exposure to 0.5 ppm, and a concentration of 1 ppm was described as being uncomfortable.

At the time of OSHA's proposal, the limits adopted by the ACGIH were a 1-ppm TLV-TWA and a 3-ppm TLV-STEL; these limits were based on the reports described above and were established to "minimize chronic changes in the lungs, accelerated aging, and erosion of the teeth" (ACGIH 1986/Ex. 1-3, p. 117). NIOSH (1976b/Ex. 1-276) reviewed these studies, as did others (Matt 1889, as cited in Flury and Zernick 1931c/Ex. 1-1199; Beck 1959, as cited in NIOSH 1976b/Ex. 1-276) that reported ocular and respiratory irritation associated with exposure to chlorine levels of around 1 ppm for 30 minutes or less. NIOSH (1976b/Ex. 1-276) recommended a 15-minute 0.5-ppm limit to prevent possible eye and respiratory tract irritation.

The United Paperworkers International Union (UPIU) (Ex. 8-37) cited the NIOSH Criteria Document (Ex. 1-276) and ACGIH Documentation (Ex. 1-3) as evidence that exposure to 0.5 ppm chlorine causes respiratory irritation. The UPIU also submitted several studies indicating that decrements in pulmonary function may persist for several days or weeks following acute exposure to concentrations of chlorine requiring medical treatment. In addition, the UPIU cited a number of studies indicating that pulp mill workers and chlorine production plant workers experience declines in pulmonary function as a result of chronic exposure to low levels of chlorine (Ex. 8-37); however, interpretation of many of these studies is complicated by a lack of exposure data or the presence of confounding exposure to other respiratory toxins, such as sulfur dioxide. The UPIU

(Ex. 8-37) supported the promulgation of a 0.2 ppm limit for chlorine.

In 1986, the ACGIH proposed revising the TLVs for chlorine to 0.5 ppm as an 8-hour TWA and 1 ppm as a 15-minute STEL. This proposal was based on a review of two recent studies. One study, a 1981 doctoral dissertation by Anglen (Ex. 108A), was sponsored by the Chlorine Institute and was conducted on 29 human subjects. This study reported statistically significant changes in pulmonary function and subjective irritation resulting from exposure to 1 ppm chlorine for eight hours. No significant ocular effects were noted at this exposure level and duration. Exposure to 0.5 ppm for eight hours was not associated with significant declines in pulmonary function, and subjective irritation was also less severe at this level than at 1 ppm (Anglen 1981, Ex. 108A). During the eight-hour exposure to 1 ppm, sensory responses of itching or burning of the throat were reported to be "just perceptible" or "distinctly perceptible." A short-term (30-minute) exposure to 2 ppm produced no increase in subjective irritation compared with controls.

These findings were confirmed in a study of eight healthy volunteers exposed to 0.5 or 1 ppm chlorine concentrations (Rotman, Fliegelman, Moore et al. 1983/Ex. 108B). Significant declines in pulmonary function were associated with exposure to 1 ppm but not to 0.5 ppm.

The Chlorine Institute (Ex. 3-828) described a recent animal study conducted by the Chemical Industry Institute of Toxicology (CIIT). In this study, groups of 20 rats were exposed to 1, 3, or 9 ppm chlorine for six hours/day, five days/week, for six weeks. Exposure to the two highest levels resulted in significant decreases in body weight. Inflammation of the upper and/or lower respiratory tract was observed in the 9-ppm group and, to a lesser extent, in the 3- and 1-ppm groups. Pathological and clinical changes were not observed in the 1-ppm group, but were seen in the 3- and 9-ppm groups.

Several rulemaking participants urged OSHA to adopt the more recent ACGIH limits of 0.5 ppm TWA and 1 ppm STEL (Exs. 3-677, 3-741, 3-828, and 3-1150; Tr. pp. 10-165 to 10-170; Tr. pp. 10-178 to 10-180). For example, the Chlorine Institute commented as follows:

- The imposition of an instantaneous ceiling PEL is inappropriate. The Chlorine Institute's University of Michigan and CIIT studies demonstrate conclusively that sensory effects and adverse pulmonary function effects are directly related to prolonged chlorine exposures and are correctly controlled by a PEL expressed as a Time Weighted Average (TWA).... The Chlorine Institute supports...[the ACGIH limits] as the correct PEL for adoption by OSHA, and we submit that the evidence is conclusive that such a PEL is totally protective of worker health in chlorine-producing and chlorine-using industries (Ex. 3-828, p. 3).

In its posthearing comment, NIOSH (Ex. 150) reaffirmed its recommended TWA of 0.5 ppm as a 15-minute limit, based on the findings of Rupp and Henschler (1967/Ex. 1-1122):

- The studies of Anglen (1981) and Rotman (1983), as summarized by the ACGIH, if considered alone, would support the ACGIH TWA TLV of 0.5 ppm with a STEL of 1 ppm. However, in the studies of Rupp and Henschler (1967), exposure to chlorine at concentrations of approximately 0.5 ppm resulted in conjunctival pain in several subjects after 15 minutes; in their second study, subjects reported respiratory irritation after exposure to 0.5 ppm for 25 minutes.... The Rupp and Henschler study (1967), although it has been criticized for lack of a control group (Ex. 3-685) confirms the Anglen (1981), Rotman et al. (1983), and CIIT studies (Ex. 3-828) that there is a significant risk of irritation and a risk of respiratory inflammation at the present PEL of 1 ppm ceiling. Reduction of the current PEL to 0.5 ppm ceiling will reduce the risk of respiratory irritation and pulmonary function changes, and minimize the subjective complaints of irritation (Ex. 150, Comments on Chlorine).

The Dow Chemical Company submitted a critical review of the NIOSH (1976b/Ex. 1-276) criteria document on chlorine and the Rupp and Henschler (1967/Ex. 1-1122) study that was prepared in 1979 by Dr. Ralph G. Smith, who directed the University of Michigan (Anglen 1981) study (Ex. 3-741, Appendix B; Tr. pp. 10-165 to 10-170). In his review, Dr. Smith criticized the Rupp and Henschler (1967/Ex. 1-1122) study because the design of the exposure facility led to uncertainties in determining actual exposure levels present in the test room. He also remarked that the chlorine was passed through "liquid paraffin," which may have produced chlorinated hydrocarbons. In addition, Dr. Smith felt that the air compressor used may have caused contamination of the air in the test room by carbon monoxide and other impurities. Dr. Smith believed these observations were important "because one of the effects allegedly resulting from short exposures to low levels of chlorine was headaches, a symptom which we have never had reported to us by a subject in the University of Michigan (Anglen 1981) exposures" (Ex. 3-741, Appendix B, pp. 9-10).

After reviewing the evidence and testimony presented in the record on the effects of exposure to chlorine gas, OSHA concludes that there is clearly a significant risk of pulmonary function impairment and sensory irritation at the current 1-ppm ceiling PEL; such effects have been demonstrated by the Anglen (1981/Ex. 108A) and Rotman, Fliegelman, Moore et al. (1983/Ex. 108B) studies in human subjects exposed to 1 ppm for 8 hours, an exposure level and duration that would be permitted by the former PEL. In addition, pulmonary inflammation has been observed in rats exposed daily for six weeks to 1 ppm chlorine. Therefore, OSHA finds that it is necessary to revise its current limit for chlorine.

The human studies by Anglen (1981/Ex. 108A) and by Rotman, Fliegelman, Moore et al. (1983/Ex. 108B) also indicate that exposure to 0.5 ppm chlorine for as long as 8 hours is not associated with impairment of pulmonary function or significant sensory irritation; these findings are in contrast to the earlier German reports upon which the NIOSH REL of 0.5 ppm (15 minutes) is based. However, the German studies, in particular those of Rupp and Henschler (1967/Ex. 1-1122), appear to have had methodological shortcomings that call into question the finding that exposure to 0.5 ppm chlorine is associated with significant acute effects. Therefore, OSHA judges, based on the more recent University of Michigan study, that an exposure limit of 0.5 ppm TWA with a 1-ppm 15-minute STEL will reduce the risk of irritation and pulmonary function decline in workers, and is today revising its limit for chlorine to these values. OSHA considers the effects of respiratory irritation and the declines in pulmonary function associated with chlorine exposure to be material impairments of health.

Page last reviewed: September 28, 2011
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Attachment I

TDD No 1-WESTON-042-15-006

Technical Direction Document

U.S. EPA, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Vendor : WESTON SOLUTIONS, INC.

TDD # : 1/WESTON-042-15-006
Amendment # :
Contract # : EP-W-06-042

TDD Title : Magnablend Sodium Chlorite
Purpose : TDD INITIATION
Priority : HIGH
Overtime Authorized : Yes
Invoice Unit :

Verbal Date : 01/26/2015
Start Date : 01/26/2015
Completion Date : 01/26/2015
Effective Date : 01/26/2015

SSID : A6KX
Project/Site Name : Magnablend Sodium Chlorite
Project Address : 100 West Sterrett Rd
County : Ellis
City : Waxahachie
State : TX
Zip Code : 75165

Work Area : Response / Removal
Work Area Code : RS
Activity : Fund Lead Removal
Activity Code : RV
Operable Unit :
Emergency Code :
FPN :
Performance Based : No

Authorized TDD Ceiling :

	Amount	LOE (Hours)
Previous Action(s) :	$0.00	0.00
This Action :	$7,000.00	0.00
New Total :	$7,000.00	0.00

Specific Elements :

See Schedule

Description of Work :

See Schedule

Region Specific :

CERCLIS:

Misc 2 :

Accounting and Appropriation Information:

SFO:

Line	Budget / FY	Approp. Code	Budget Org.	Program Element	Object Class	Site Project	Cost Org.	DCN Line-ID	Funding Category	TDD Amount
1	14	T	6A00	303DC6	2505	A6KXRS00	C001	146ARSC030-001	REMOVAL SUPPORT	$7,000.00

U.S. EPA, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

TDD # : 1/WESTON-042-15-006
Amendment # :
Contract # : EP-W-06-042

Vendor : WESTON SOLUTIONS, INC.

Project Officer : Will LaBombard *(Signature)* *(Date)*	**Branch Mail Code:** **Phone Number :** 214-665-7199 **Fax Number :**
Contracting Officer Representative : John Martin *(Signature)* *(Date)*	**Branch Mail Code :** **Phone Number :** 214-665-6748 **Fax Number :**
Contract Specialist: Michael J. Pheeny *(Signature)* *(Date)*	**Branch Mail Code :** **Phone Number :** 214-665-2798 **Fax Number :**
Contracting Officer : Michael J. Pheeny Electronically Signed by Michael J. Pheeny 02/02/2015 *(Signature)* *(Date)*	**Branch Mail Code :** **Phone Number :** 214-665-2798 **Fax Number :**
Other Agency Official : *(Signature)* *(Date)*	**Branch Mail Code :** **Phone Number :** **Fax Number :**

Specific Elements: Document -The removal activities. Prepare a written report.,Support -The removal activities,Advise -The OSC on disposal options and completion of the removal activities.
Description of Work: Initial TDD funding ceiling: $7,000.

Site tasks to support ER activitiews include: respond immediately to scene, provide air monitoring, coordinate with other responders, maintain logbook, photodocument, brief OSC frequently, and draft POLREP.